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10/808,501	03/25/2004	Jung-han Lee	1793.1180	5710

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EXAMINER	
TYLER, NATHAN K	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/808,501	LEE, JUNG-HAN	
	Examiner	Art Unit	
	NATHAN K. TYLER	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12 and 19-54* is/are pending in the application.

4a) Of the above claim(s) *2,11,27,29-36,43 and 47-54* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-10,12,19-26,28,37-42 and 44-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 2, 11, 27, 29-35, 36, 43, and 47-54 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 28 January 2008.

Claims 2, 11, 27, 36, and 43 were indicated as being either included in Species I, or generic. These claims are readable on Species II, as they contain the limitation "arranging a left-half and a right-half of a first pattern, which are arranged symmetrically to a center, on a top side and on a bottom side," or a similar variant. This language is used in Applicant's description of the drawings for Figs. 20-26, which depict Species II.

2. Applicant's election with traverse of Species I in the reply filed on 28 January 2008 is acknowledged. The traversal is on the ground(s) that Applicant believes the species do not require different fields of search. This is not found persuasive because the limitations present in the claims drawn to Species II require a different field of search than the claims drawn to Species I. The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3-10, 12, 19-26, 28, 37-42, and 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamada et al. (US 6089766 A) and Miyazaki et al. (US 6408156 B1).

Regarding **claim 1**, Yamada discloses a color registration control method comprising: developing a registration pattern with predetermined colors by overlapping a left-half pattern and a right-half pattern of a second pattern, and a left-half pattern and a right-half pattern of a first pattern (Fig. 7 shows several patterns. Fig. 7A and 7B can be considered a right and left half of a second pattern. Fig. 7C and 7D the right and left halves of a first pattern); detecting density information of the left-half pattern and the right-half pattern of the registration pattern by using a density sensor ("the density of the printed patterns is measured by sensor 31" at column 9, line 62), and sending the detected information to a comparator ("The densities of the two printed "one dot--one space" test patterns are measured by sensor 31 and the densities of the two are compared" at column 10, line 28); calculating a color registration error in the comparator by comparing the density of the left-half pattern with the density of the right-half pattern (Fig. 13A shows steps to determine a registration error based on compared densities); and outputting a

color registration control signal in the control unit in response to an error signal received by the comparator (See bottom of Fig. 13A: "SHIFT=0;" "SHIFT=4," etc…).

Yamada does not disclose that the right and left half patterns are arranged symmetrically to a center, respectively, in a scanning direction, nor does Yamada disclose a first and second density sensor.

Miyazaki teaches a color registration control method that uses a right and left half pattern arranged symmetrically to a center in a scanning direction (Fig. 15A) and that uses two density sensors to read the densities of these right and left half patterns (Fig. 3, sensors 24L and 24R).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the color registration control method disclosed by Yamada to use two density sensors to read two sets of patterns arranged symmetrically to a center in a scanning direction as taught by Miyazaki, so that two patterns could be read at once, improving the speed of the registration operation.

Regarding **claim 3**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that in the first and second patterns, an identical bit line is developed on an identical location (Miyazaki Fig. 15A shows first pattern 4 and second pattern 3 sharing identical bit lines).

Regarding **claim 4**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that the first and second patterns comprise bit lines, wherein each of the bit lines is a multiple of 2 and is arranged in a sub-scanning direction (Yamada Fig. 7, 1 dot-1 space, 2 dot-2 space, 4 dot-4 space, etc… Miyazaki shows the lines arranged in a sub-scanning direction).

Regarding **claim 5**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that the first and second patterns comprise 2-, 4-bit lines that are arranged in a sub-scanning direction (Fig. 7, shows 1-bit, 2-bit, and 4-bit. Miyazaki shows the lines arranged in a sub-scanning direction).

The combination of Yamada and Miyazaki as applied to claim 1 does not explicitly disclose 8-, 16-, and 32-bit lines.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to extend the teaches of Yamada to include the use of 8, 16, and 32-bit lines, in order to detect a shift larger that 4 or -3 (Fig. 13A shows that only using up to a 4 dot-4 space pattern allows for the detection of shift range from -3 to +4. A 32-bit line pattern would allow for detection of a -31 to +32 bit shift).

Regarding **claim 6**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that in the calculating a color registration error, if a density difference between the left-half and the right-half is equal to or greater than a reference value, one of the left-half and the right-half is set to a first binary number, and the other is set to a second binary number (The result of a comparison will be logic 1 or 0, as shown in Yamada Fig. 14 by Y or N), and if a density difference between the left-half and the right- half is less than the reference value, determination is held back and a density detection table is calculated (density detection table shown in Yamada Fig. 15).

Regarding **claim 7**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that in the outputting a color registration control signal, if an error occurs, the color registration control signal is output and the method further comprises developing again the

registration pattern with predetermined colors by overlapping the left-half pattern and the right-half pattern of the second pattern, and the left-half pattern and the right-half pattern of the first pattern, which are arranged symmetrically to the center, respectively, in the scanning direction (Yamada Fig. 13A shows that when an error occurs (S3 = NO), the patterns are again developed at step S6).

Regarding **claim 8**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that in the outputting a color registration control signal, if the error does not occur, a current color registration control process is finished and the method for controlling the color registration of the image forming apparatus is repeatedly performed for other color registration control (Yamada Fig. 13A shows that when an error does not occur (S3 = YES), other color registration control is performed (S4).

Regarding **claim 9**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that in the outputting a color registration control signal, the control unit outputs a signal controlling a laser scanning unit of a developer ("Commands from CPU 21 to photosensor 31 activate LED 32" at column 9, line 32) and a belt steering apparatus ("CPU 21 sends commands to a paper forwarding mechanism" at column 9, line 17).

Regarding **claim 10**, the combination of Yamada and Miyazaki as applied to claim 1 discloses developing a registration pattern with predetermined colors by overlapping a left-half pattern and a right-half pattern of a second pattern, which have a predetermined bit line difference to each other in a sub-scanning direction (Miyazaki Fig. 15A shows arrangement of left and right half patterns, Yamada Fig. 7shows developing patterns with a predetermined bit-line difference: 1 shift, 2 shift, 4 shift, etc…), and a left-half pattern and a right-half pattern of a

first pattern, which are arranged symmetrically to a center, respectively, in a scanning direction; detecting density information of the left-half pattern and the right-half pattern of the registration pattern by using a first and a second density sensor, and sending the detected information to a comparator; calculating a color registration error by comparing the density of the left-half pattern with the density of the right-half pattern in the comparator; and outputting from a control unit a color registration control signal according to the error signal received by the comparator (see grounds for rejection for claim 1).

Regarding **claim 12**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that in the first and second patterns, an identical bit line is developed on an identical location (Miyazaki Fig. 15A shows first pattern 4 and second pattern 3 sharing identical bit lines).

Regarding **claim 19**, the combination of Yamada and Miyazaki as applied to claim 1 discloses a color registration control method of an image forming apparatus, the method comprising: developing at least one registration pattern with predetermined colors; detecting density information of a first half and a second half of the registration pattern; calculating a registration error by comparing the density of the first half and the second half of the registration pattern; outputting a registration control signal in response to an error signal received so that registration can be controlled through a modified registration control signal (see grounds for rejection for claim 1).

Regarding **claim 20**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that the developing the registration pattern comprises: arranging a first half and a second half of a first pattern and a second pattern, symmetrically to a center, respectively, in a

scanning direction; and putting the first half and the second half of the first pattern on top of the first half and the second half of the second pattern, respectively; in order to develop the registration pattern (As shown in Miyazaki Fig. 15A, the shaded pattern for example, pattern 4, is placed on top of the black pattern for both the left and right sides).

Regarding **claim 21**, the combination of Yamada and Miyazaki as applied to claim 1 discloses arranging at least one bit line of each of the first and second patterns in a sub-scanning direction, wherein each bit line is a multiple of 2 (see grounds for rejection for claim 4).

Regarding **claim 22**, the combination of Yamada and Miyazaki as applied to claim 1 discloses arranging at least a 2-, 4-, 8-, 16-, and 32-bit line of the first and second pattern in a sub- scanning direction (see grounds for rejection for claim 5).

Regarding **claim 23**, the combination of Yamada and Miyazaki as applied to claim 1 discloses arranging at least one bit line of the first pattern symmetrically to the center and arranging at least one bit line of the second pattern identically in the first and the second side (see Miyazaki Fig. 15A).

Regarding **claim 24**, the combination of Yamada and Miyazaki as applied to claim 1 discloses arranging at least a 2-, 4-, 8-, 16-, and 32-bit line of the first pattern symmetrically to the center and arranging the second pattern in at least a 2-, 4-, 8-, 16-, and 32-bit line in the first half and the second half of the second pattern (see grounds for rejection for claims 5 and 23).

Regarding **claim 25**, the combination of Yamada and Miyazaki as applied to claim 1 discloses developing the registration pattern after detecting the putting of the first half and the second half of the first pattern on top of the first half and the second half of the second pattern,

respectively (see Yamada Fig. 14A, after the patterns are detected at S3, a registration pattern is developed at S4).

Regarding **claim 26**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that the first half of each of the first and second patterns is a left-half side and the second half of each of the first and second patterns is a right-half side (see grounds for rejection for claim 1).

Regarding **claim 28**, the combination of Yamada and Miyazaki as applied to claim 1 discloses arranging a first half and a second half of a first pattern, symmetrically to a center, respectively, in a scanning direction; and putting a first half and a second half of a second pattern, each half having a predetermined bit line difference to each other in a sub-scanning direction, on the first half and the second half of the first pattern, respectively, in a scanning direction, in order to develop the registration pattern (see grounds for rejection for claim 10).

Regarding **claim 37**, the combination of Yamada and Miyazaki as applied to claim 1 discloses calculating a density detection table when detecting the density information of the first half and the second half of the developed pattern (Yamada Fig. 15), setting a first binary number to one of the first half and the second half if a density difference between the first half and the second half is equal to or greater than a reference value and setting a second binary number to the other half (see grounds for rejection for claim 6), and not setting a binary number to either half if there is no density difference between the first half and the second half ("Accordingly, in some cases, correct results cannot be obtained and alignment adjustment cannot be performed. A method for accurately detecting density differences even when a sensor outputs minuscule differences for the "one dot--one space" patterns is explained below" at column 12, line 8).

Regarding **claim 38**, the combination of Yamada and Miyazaki as applied to claim 1 discloses calculating the registration error by obtaining a reference density table from the developed registration patterns when bit line errors occur to the first half and the second half in the reference registration pattern and storing the reference density table in the CPU, wherein after storing the reference density table in a CPU, developing a second registration pattern is developed in the image forming apparatus and comparing the densities of the first half and the second half of the second registration pattern in order to obtain the detected density table (Yamada Fig. 15 shows a table with reference values and detected values "normal" and "shift").

Regarding **claim 39**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that by comparing the detected density table with the reference density table the number of bit lines of registration error that have occurred can be determined (Yamada Fig. 14 shows the results of the comparison used to determine amount of "head shift").

Regarding **claim 40**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that when detecting the density information of the first half and the second half of the developed registration pattern, if there is no registration error, the registration pattern becomes a reference registration pattern corresponding to an error value of 0 (Yamada Fig. 15 shows the value detected for Y: normal. As shown in Fig. 14, a Y for every pattern is equivalent to a shift of 0, or no registration error).

Regarding **claim 41**, the combination of Yamada and Miyazaki as applied to claim 1 discloses determining if the modified registration is accurate by repeating the method of developing the registration pattern with predetermined colors; detecting and comparing density information of the first half and the second half of the registration pattern; calculating the color

registration error from the detected density information by comparing the density of the first half and the second half of the registration pattern; and determining whether the registration error has occurred; wherein if no error is detected, a next color registration control can be started (see Yamada Fig. 13A. When no error is detected (S3 = YES), next color registration control is performed (S4)).

Regarding **claim 42**, the combination of Yamada and Miyazaki as applied to claim 1 discloses that if an error is detected, the density information of the first half and the second half of the developed pattern vary, respectively (Fig. 15 shows varied detected densities for an error).

Regarding **claim 44**, the combination of Yamada and Miyazaki as applied to claim 1 discloses a color registration control method of an image forming apparatus, the method comprising: developing a registration pattern with predetermined colors; detecting density information of a first half and a second half of the registration pattern (see grounds for rejection for claim 1); calculating a detection density table from the detected density information in order to obtain a color registration error; obtaining a reference density table and comparing the reference density table with the detection density table; and determining from the comparison whether a registration error has occurred (See Yamada Fig. 15 showing reference and detected density values for determining a registration error).

Regarding **claim 45**, the combination of Yamada and Miyazaki as applied to claim 1 discloses correcting the registration error by outputting a color registration control signal so that registration can be controlled through a modified registration ("Next, portions of the original image are shifted by distances which correspond to the amount of misalignment. Thus, a correct printing image is obtained" at column 9, line 49).

Regarding **claim 46**, the combination of Yamada and Miyazaki as applied to claim 1 discloses determining if the modified registration is accurate by repeating the method of developing the registration pattern with predetermined colors; detecting and comparing density information of the first half and the second half of the registration pattern; calculating the color registration error from the detected density information by comparing the density of the first half and the second half of the registration pattern; and determining whether the registration error has occurred, wherein if no error is detected, a next color registration control can be started (see Yamada Fig. 13A. When no error is detected (S3 = YES), next color registration control is performed (S4)).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN K. TYLER whose telephone number is (571)270-1584. The examiner can normally be reached on M-F 7:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, King Poon can be reached on 571-272-7440. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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